Dataset Expocode	**06AQ20160412**
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Dataset	**Funding Info:** **Initial Submission (yyyymmdd):** 20170113 **Revised Submission (yyyymmdd):**
Campaign/Cruise	**Expocode:** 06AQ20160412 **Campaign/Cruise Name:** **Campaign/Cruise Info:** **Platform Type:** **CO2 Instrument Type:** Equilibrator-IR or CRDS or GC **Survey Type:** Research Cruise **Vessel Name:** Polarstern **Vessel Owner:** **Vessel Code:** 06AQ
Coverage	**Start Date (yyyymmdd):** 20160412 **End Date (yyyymmdd):** 20160508 **Westernmost Longitude:** 60.4091 W **Easternmost Longitude:** 9.1711 W **Northernmost Latitude:** 44.9742 N **Southernmost Latitude:** 47.4297 S **Port of Call:** Punta Arenas **Port of Call:** Bremerhaven
Sea Surface Temperature	**Location:** Keel of ship, 11 meters depth, at seawater intake for pCO2 system **Manufacturer:** SEABIRD **Model:** SBE38 **Accuracy:** 0.01 (°C if units not given) **Precision:** 0.001 (°C if units not given) **Calibration:** none **Comments:** Two sensors are permanently installed on Polarstern's bow and keel seawater intakes. Both are regularly calibrated, both are accurate better than 0.01 degC. Very sporadically, and only when conditions allow (i.e., not in stratified conditions in fjords, etc.!), holes in keeltemp dataset are filled from bowtemp dataset. If both datastreams are missing, no pCO2 (and associated) data are reported.

Sea Surface Salinity	**Location:** Keel of ship, 11 meters depth, at seawater intake for pCO2 system **Manufacturer:** SEABIRD **Model:** SBE21 **Accuracy:** 0.01 **Precision:** 0.001 **Calibration:** none **Comments:** Two sensors are permanently installed on Polarstern's bow and keel seawater intakes. Both regularly calibrated, both are accurate to better than 0.01 psu. However, the keel intake samples disturbed water, so may slightly differ from bow intake (where the seawater for pCO2 analysis comes in as well). We preferentially use the keel value, but if these are temporarily missing, the bow-values are used. If, temporarily, neither of these values is available, we either use gap filling or we use the mean of the valid values of the current cruise leg or similar, which does not appreciably affect pCO2_wet_istemp
Atmospheric Pressure	**Location:** Ship's mast, 30 meters **Normalized to Sea Level:** yes **Manufacturer:** ? **Model:** ? **Accuracy:** better than 1 mbar (hPa if units not given) **Precision:** better than 1 mbar (hPa if units not given) **Calibration:** none **Comments:** Obtained from Polarstern's central datalogging system, from ship's primary scientific meteorological measurement setup. Considered to be of very high accuracy. Resolution rounded to 1 mbar, so likely error up to 0.5 mbar.
Atmospheric CO2	**Measured/Frequency:** Yes, approx every 3 hours **Intake Location:** Crow's nest, 30 meters **Drying Method:** Peltier + Nafion, down to 1 ppt. **Atmospheric CO2 Accuracy:** 1 ppm **Atmospheric CO2 Precision:** 0.01 ppm
Aqueous CO2 Equilibrator Design	**System Manufacturer:** General Oceanics GO8050 **Intake Depth:** 11 meters **Intake Location:** Ship's keel **Equilibration Type:** showerhead equilibrator **Equilibrator Volume (L):** 2 **Headspace Gas Flow Rate (ml/min):** 100 **Equilibrator Water Flow Rate (L/min):** 2 **Equilibrator Vented:** Yes **Equilibration Comments:** Uses pre-equilibrator on vent. Lag is determined (and compensated) per 7-day block of data from minimizing difference between insitu and equilibrator temp, and generally is between 120 and 240 seconds. **Drying Method:** Peltier + Nafion, down to 1ppt.
Aqueous CO2 Sensor Details	**Measurement Method:** IR **Method details:** **Manufacturer:** LICOR **Model:** 7000 **Measured CO2 Values:** xCO2(dry) – WE CORRECT LICOR-REPORTED VALUE FOR RESIDUAL ~ 1PPT WATER VAPOUR TO YIELD 'BONEDRY' xCO2 **Measurement Frequency:** Every 120 sec, except during calibration routines **Aqueous CO2 Accuracy:** 1 uatm **Aqueous CO2 Precision:** 0.01 uatm

Sensor Calibrations: Continuous, following Pierrot 2009
Calibration of Calibration Gases: Ship
Number Non-Zero Gas Standards: 3
Calibration Gases:
Linde. Three standards, generally 200, 400, 650. We use N2 5.5 for zero gas.
Comparison to Other CO2 Analyses:
Comments: Calibration of measurements performed using 3 standards AND the N2-standard. This deviates from Pierrot 2009, who recommends calibrating agaist CO2-standards only. However, due to occasional loss (over the several years of operation of the instrument) of one of the CO2-standards, the additional use of N2 salvages a lot of data.
Method Reference:
Pierot 2009

Equilibrator Temperature Sensor

Location: Sensor in
Manufacturer: Fluke Hart Scientific
Model: HT1521 readout + 5610-I-6 probe
Accuracy: 0.01 (°C if units not given)
Precision: 0.002 (°C if units not given)
Calibration: none
Comments: Equilibrator temperature sensor (Fluke) is occasionally calibrated using ice or water at roomtemp (in dewar) against recently calibrated other high-quality thermometers (generally other Fluke's). Comparison with known-good Fluke probe+readout at ~0 decC and ~25 degC in Nov 2013 showed differences <0.002 deg.

Equilibrator Pressure Sensor

Location: Diferential pressure sensor between equ and lab
Manufacturer: Setra
Model: 239
Accuracy: 0.25 (hPa if units not given)
Precision: 0.05 (hPa if units not given)
Calibration: none
Comments: We get EQUpres from differential pressure with lab, and ascertained lab pressure does not differ appreciably from atmospheric pressure. Differential pressure sensor was factory calibrated in 2007 and never since. Offset are zero gas flow and zero water flow today still are well below 0.25 mbar.

Additional Information

Suggested QC flag from Data Provider: NA
Additional Comments: Data have been carefuly pre-QC'ed for outliers, flow rates, calibration linearity, etc.
Citation for this Dataset:
Other References for this Dataset: